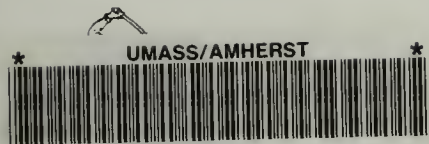


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INTERIM GUIDELINES ON RECLAIMED WATER (REVISED)

Effective Date: 1/3/00

Policy #: BRP/DWM/PeP-P00-3

Program Applicability: DEP/BRP Watershed Permitting Program

Supersedes Policy #: BRP/DWM/WPCPG99-1

Approved by:

Arleen O'Donnell, Assistant Commissioner
Bureau of Resource Protection

PURPOSE: To establish an interim approach that DEP will employ when regulating the use of reclaimed water. Reclaimed water is highly treated sanitary wastewater potentially available for land uses other than directly potable.

APPLICABILITY: Applies to DEP Watershed Permitting Program staff and supervisory personnel, and to municipalities, developers, golf courses, nurseries and other businesses. A pilot program has been added to allow DEP to evaluate uses not presently contained in the guidelines.



Reclaimed Water Use¹ The Massachusetts Approach

The Massachusetts Department of Environmental Protection has developed interim guidance describing how the use of reclaimed water will initially be regulated in Massachusetts.

Reclaimed water is wastewater that has been treated at a wastewater treatment plant to an advanced degree and used again for various applications.

There are several parts of the state where rapid growth and demographic changes have caused water resource areas such as aquifers, rivers, ponds and wetlands to suffer changes associated with significantly lower water tables and diminished baseflow.

In other parts of the country and the world the use of reclaimed water has been demonstrated to be a viable, affordable approach to minimizing the impact to stressed water resources areas. As little as 5% of the water used by humans is actually ingested or used for food preparation. The use of reclaimed water for land uses that do not require the extraordinary quality of drinking water can significantly reduce the pressure to develop new drinking water sources or to over-employ existing water sources.

In an effort to familiarize and educate ourselves about the actual implementation of reclaimed water projects we have researched and discussed with other states with active reuse programs, their approaches, successes and failures and their retrospective thoughts on how they would have improved on their methodology. One of the advantages of beginning a new program such as this one is that there is a wealth of information about many aspects of our new program that other states have already dealt with. We have assimilated many of the characteristics of others' programs into our own and have developed a hybrid that we believe addresses the state specific features we need to consider.

Therefore, we initially propose to limit the use of reclaimed water to spray irrigating golf courses, landscaping, artificially recharging aquifers and toilet flushing. The artificial recharging of aquifers shall be permitted only in basins, sub-basins and watersheds acknowledged to be stressed water resource areas, where it is necessary to replenish streamflow, enhance the productivity and capacity of an aquifer, and/or improve upon or mitigate water quality problems.

As our knowledge base and experience increases we may elect to expand regulated uses of reclaimed water.

The public health related safeguards that will be associated with each reclaimed water project make us confident of the ability to reclaim water in a manner that protects the public health.

The water quality criteria for the treated wastewater is extremely rigorous, requiring that reclaimed water be virtually pathogen and contaminant free. Wastewater treatment plants contracted to deliver reclaimed water will not only have demonstrated the ability to consistently meet the rigorous

¹ Revised Interim Guidance: Effective Date – 1/3/00

water quality standards, but will also be required to have an alternate disposal option that can be employed immediately if reclaimed water criteria are not met. All of the treatment plants will be required to include duplicative systems and alternate forms of power so that plant treatment capabilities are not jeopardized during power outages or repairs. Best Management Practices aimed at minimizing direct human exposure will be required of all projects.

Considered together the safeguards required are in our view sufficiently protective to allow us to promote the undertaking of specific types of reuse projects.

Initially, the state-issued groundwater discharge permits for the treatment plants generating the reclaimed water may be permits of a shorter duration than conventional permits in order to allow us to evaluate the implementation of the projects.

We welcome the interest and pursuit of reclaimed water use projects in our state and will work with project proponents to insure safe reuse that has beneficial water resource implications.

RECLAIMED WATER USE ²

(Interim Guidance)

Massachusetts Department of Environmental Protection

² Revised Interim Guidance: Effective Date – 1/3/00

Introduction

Many parts of Massachusetts, despite our relatively wet climate, are suffering the impacts of over-stressed, over utilized water resources. Only 3% of water used nationally is used for drinking or cooking. The balance, approximately 97%, is used for bathing, laundry, dishwashing, toilet flushing, outdoor use and industrial/commercial use.

One of our state's approaches to addressing water resource deficits is to promote and encourage the innovative reuse of treated wastewater while continuing to consider the public's health as the controlling factor.

This can be achieved by: (1) reducing the number of pathogenic bacteria, viruses and parasites to a level as low as can be reasonably achieved; (2) controlling chemical contaminants; (3) limiting public exposure; (4) maintaining levels of chemicals and pathogens so that they pose no appreciable risk of harm to health or the environment, considering both planned and occasional unplanned exposure or changes in site conditions and use; and (5) implementation of site specific best management practices and public awareness programs that promote safe use.

The level of wastewater treatment required and the institutional management practices to be employed will be dependent on the level of public exposure and environmental sensitivity.

This Interim Guidance articulates how the Department of Environmental Protection will approach and regulate the initial reclaimed water proposals that confront us. We propose to introduce the reclaimed water use concept in our regulatory scheme by allowing reuse for those uses that are most likely to employ it in our state. We anticipate requests to use reclaimed water on golf courses, for landscaping purposes, artificially recharging aquifers and toilet flushing.

We embrace the concept of reclaimed water use and recognize the fiscal, environmental and social benefits of doing so. Development patterns in Massachusetts and specific hydrogeologic settings that are not suitable for water withdrawals or wastewater disposal make the use of reclaimed water an attractive and necessary option.

We recognize that in Massachusetts and other New England states that have only recently begun to experience stressed water resource areas, the concept of reclaimed water is novel and will require a significant public outreach/public awareness effort in order to address or respond to the public's concerns about the use of reclaimed water. As has been the case with other more arid states, public acceptance of this new and valuable resource will grow as we become more accustomed to the use of reclaimed water.

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A. Reuse and the Regulatory Framework

The Commonwealth of Massachusetts is committed to inviting the type of reclaimed water use that is discussed in this guidance assuming that all of the associated public health related safeguards included herein are incorporated into reuse projects.

As is mentioned earlier, this document will remain a dynamic working guidance that may be added to or subtracted from as our knowledge and experience with reclaimed water projects broadens.

This Interim Guidance represents our preliminary approach to embracing a complicated, sophisticated new way of supplementing stressed water resources.

As is always the case when introducing and regulating new programs, there will be those who find our approach to be lenient, and those that find it rigid and overcomplicated.

We welcome reclamation projects and the knowledge and experience that will inherently accompany them. We will consider and regulate them cautiously because they are new and because they bring a category of resource water closer to the public than we are accustomed to.

Contacting your regional DEP office at the beginning of your reuse project planning may save time and prevent confusion. Once familiar with the project proposal DEP personnel will be able to describe all of the permits necessary for the proposed project and discuss process and timeframe issues. Please see *Appendix B*.

1. Groundwater Discharge Permits - 314 CMR 5.00

Reuse projects that involve the use of reclaimed water in the forms of drip or spray irrigation, injection into the subsurface or spreading on the land surface will be required to obtain a Groundwater Discharge Permit from DEP Division of Watershed Permitting. All permits are subject to the public notice requirements of 314 CMR 2.00. Existing and new permitted discharges exceeding 10,000 gallons per day into the approved Zone IIs for public water supply wells are considered a form of reuse and are governed by this guidance. Because permitting for reclaimed water usage is new to Massachusetts, the Groundwater Discharge regulations do not presently contain standards and conditions specific to reclaimed water use. Until new regulatory provisions are adopted, all groundwater discharge permits issued for reclaimed water projects will contain conditions incorporating the applicable standards for Urban Reuse, Discharge of Treated Wastewater into Zone II of a Community Water System, or Toilet Flushing as set forth in this Interim Guidance.

This Interim Guidance allows the use of reclaimed water by either the wastewater treatment plant that generates the reclaimed water, or by another party that contracts with the wastewater treatment plant for a supply of reclaimed water. Where a wastewater treatment plant supplies reclaimed water to be used by another party, DEP requires, as a condition of its Groundwater Discharge Permit (GWDP), that the wastewater treatment plant enter into a binding agreement with the reclaimed water user to ensure that construction, operation, maintenance and monitoring of the

reclaimed water meet the requirements of the Groundwater Discharge Permit and this Interim Guidance.³ The binding agreement will be incorporated by reference in the GWDP. **Accordingly, as permittee, the wastewater treatment plant owner is accountable to DEP for all violations of the permit or binding agreement including failure of the wastewater reuser to comply with the binding agreement.** For example, spray irrigating outside of designated hours established in the permit by a user golf course would be grounds for a DEP enforcement action against the WWTP, even though the golf course is responsible for the spray irrigation under the terms of the binding agreement. The wastewater treatment plant owner would have to pursue its own recourse against the golf course under the binding agreement. DEP approval of the binding agreement is required prior to issuance of a groundwater discharge permit for such wastewater reuse projects. In most cases, an agreement substantially equivalent to the Model Agreement for the Delivery and Use of Reclaimed Water contained at *Appendix C* to this Interim Guidance will be sufficient.

These groundwater discharge permits are issued for treatment plants that discharge 10,000 gallons per day or more, and are processed by our regional offices located in Wilmington, Worcester, Springfield and Lakeville. Applications for permits are available through the Customer Service Centers within each regional office as are copies of the Regulations and associated guidance materials. Please see *Appendix B*.

All of the engineering requirements, hydrogeologic evaluations and monitoring required in a Groundwater Discharge Permit are applicable to reuse projects. Some of the primary requirements in the permit application are:

- An engineering study that describes the wastewater treatment technology to be employed and the water quality anticipated to result;
- A map showing all local and regional water resources (wells - public/private, wetlands, Zone IIs, Interim Wellhead Protection Areas (IWPA), surface water bodies and setbacks, etc., within one-half mile of the proposed project);
- A mounding analysis demonstrating that there is sufficient zone of aeration between the bottom of the leaching or disposal area and the historically high water table;
- A hydrogeologic study demonstrating where the discharged effluent will go and what it will affect and the anticipated groundwater quality resulting from the discharge;
- A monitoring program that describes the type and frequency of samples of final effluent, groundwater from monitoring wells or lysimeters and proximal surface waters. And also the frequency of on-line sampling, monitoring and recording to be performed at the treatment plant.

³ The effectiveness of using binding agreements as a permitting tool will be evaluated under this Interim Guidance. Future permitting frameworks may instead require a reclaimed water use permit issued directly to the reclaimed water user.

- A discussion of the appropriate levels of filtration and disinfection required.

In addition to these basic GWDP requirements, other specific requirements are necessary to accommodate the potentially increased risk from human exposure associated with reuse projects. Historically in Massachusetts, groundwater permits have regulated disposal in rapid sand infiltration beds or subsurface leaching fields where human contact was not a primary issue. In contrast, human contact is the primary concern with reuse proposals employing spray irrigation.

In addition, all proposals to use reclaimed water from permitted treatment plants for spray irrigation must provide an alternative, permitted disposal option to be used during emergency situations and for non-growing season disposal.

Accordingly, reuse projects must comply with additional requirements for reclaimed water quality, assurances of consistent plant operation and best management practices to minimize contact and public awareness efforts geared toward safe contact.

2. Treatment Plant Reliability

Wastewater treatment plants permitted to discharge 10,000 gallons per day or more under 314 CMR 5 must meet specific reliability standards which are dependent on the sensitivity of their location and must get a GWDP from the Department.

A. At a minimum, all wastewater treatment facilities shall be designed in accordance with the standards included in the latest edition of TR-16: Guidelines for the Design of Wastewater Treatment Works and other applicable DEP guidelines.

B. In delineated, approved Zone IIs, where the degradation caused by poorly treated effluent for even a short period of time would be unacceptable, the Department requires additional treatment measures not specifically listed either in this guidance document or TR-16. Such measures include designing the system to meet EPA Class I Reliability Standards. The DEP regional office should be contacted for further information. Typical additional design components may include, but are not limited to:

- ☐ two independent and separate sources of power, with the backup source sufficient to operate all vital components during peak flow conditions, together with critical lighting and ventilation
- ☐ unit redundancy
- ☐ additional storage
- ☐ sufficient inventory of spare equipment and parts to minimize the time period that treatment plant operations are off-line.

3. National Pollutant Discharge Elimination System (NPDES) Permits - 314 CMR 3.00

Reused water that is discharged into an unlined surface water body may be required to obtain an NPDES Permit from Region I EPA and a water quality certification permit from DEP. Where the reclaimed water will be supplied by a treatment plant to another user, the treatment plant's NPDES permit will be modified to incorporate the conditions of this Interim Guidance. As with the groundwater discharge permit, the treatment plant will be the permittee, and the reclaimed water user will be bound to adhere to the permit conditions by means of the binding agreement between the parties.

These permits are required in order to ensure that discharges to the surface water body will not adversely affect water quality so as to result in significant changes to the river or the resources and wildlife associated with the river. Since there are frequently more than one permitted discharge on surface water bodies, the cumulative effect of the discharges on water quality must be evaluated. Please contact your regional DEP Office (*Appendix B*) to inquire about the need for an NPDES Permit.

If DEP determines that an NPDES Permit is the appropriate regulatory mechanism, the contact person at Region I EPA would be the Massachusetts coordinator, Jane Downing.

4. Massachusetts Water Management Act - 310 CMR 36.00

The Water Management Act (WMA) program regulates water withdrawals of 100,000 gallons per day or more. Reclaimed water projects may directly or indirectly involve Water Management issues. Reclaimed water users who must supplement with pumped groundwater and/or surface water exceeding the WMA 100,000 gpd threshold, require a WMA permit. This may pertain to some golf course projects.

It is imperative that reclaimed water users that contract with treatment plants receive the water volume and water quality which they contracted for in order to avoid Water Management Act compliance issues, such as withdrawals of greater than the allowable flow.

DEP personnel contacted by reclaimed water project proponents will determine when a Water Management Act permit will be necessary.

5. Massachusetts Environmental Policy Act - M.G.L. c.30 s. 61-62H - 301 CMR 11.00

Some reclamation projects may surpass threshold values that trigger the requirements to complete either an Environmental Notification Form (ENF) or a more detailed Environmental Impact Report (EIR). Please contact the Executive Office of Environmental Affairs Assistant Secretary for the MEPA unit to determine applicability of the MEPA thresholds and requirements. Please review section 301 CMR 11.03(5) to determine if threshold are applicable to your project.

6. State/Local Permits

Some reclaimed water projects may require the oversight of local regulatory authorities. For example, projects that require work in or proximal to wetlands or rivers will need to communicate their intentions to the Conservation Commission. In addition, depending upon the volume of reclaimed water use the local Board of Health may have specific permits. Under the Massachusetts Wetlands Protection Act, any work within any area subject to jurisdiction under the Act, or within the regulatory buffer zone, will require a permit.

7. Public Awareness

Experience nationally demonstrates that an early, open, and thorough public awareness effort on the part of entities utilizing reclaimed water is very effective in diminishing the fears and suspicions frequently encountered when considering the use of reclaimed water.

To promote consumer acceptance of reclaimed water, the DEP recommends that purveyors and end users continually inform the public, especially potential users, of project status as regulatory and infrastructure decisions are being formulated. This should aid in the public's understanding of the safeguards and rigorous consideration the project is being given and will provide a sense of involvement and inclusion. Groundwater discharge permits for reclaimed water use will require users/permittees to promote public awareness of reclaimed water use.

Employees of the entity utilizing the reclaimed water should be well versed and trained in relating to the public, the safeguards used by their employer and the benefits of using reclaimed water.

Public Awareness Requirements

In conjunction with public notification required as part of receiving a Groundwater Discharge Permit entities using reclaimed water must:

1. Publish and have available at their facility brochures or fact sheets explaining the process used to treat and deliver reclaimed water to the facility, the benefits to the community and the safeguards employed to make the use of reclaimed water safe for users and abutters.
2. All reclaimed water plumbing and out-of-sight fixtures must be color coded purple.
3. Signs must be posted and portrayed symbolically where public access to reclaimed water is possible, clearly communicating that it is not for drinking. Signs and symbols should utilize black letters with a purple background and should be sized and located so that they are readily apparent to the public. An example of a **DO NOT DRINK** graphic is included in this interim guidance as *Appendix D*. Signs should be in English and any additional locally employed language.

Cross Connection/Backflow Prevention

A cross connection/backflow prevention inspection must be undertaken that culminates in a test of the system's separation from potable water, and periodic testing as required by 310 CMR 22.22, Cross Connection Distribution System Protection.

B. Urban Reuse

The reclaimed water use requirements described in the urban reuse section pertain to golf courses and landscaping. Since both forms of reuse require the spraying or possibly drip irrigating of reclaimed water it is important to combine excellent water quality with appropriate best management practices to ensure safe reuse.

1. Golf Courses

Proposals to discharge treated effluent onto golf courses have recommended spray irrigation and subsurface discharge to leaching fields as means of disposal. Short and long term holding options discussed have been ponds, tanks and the subsurface.

An assortment of ownership and treatment scenarios have arisen involving golf courses as the final receptor of treated wastewater.

It is likely that municipalities as owners, operators and permit holders of wastewater treatment plants may look to municipal or privately-owned golf courses as suitable disposal points that need large quantities of water for turf management. Private companies interested in defraying high sewer bills and pursuing environmentally sound water reuse will presumably join municipalities in investigating reuse options.

Since spray irrigation in New England is a seasonal option only, alternative mechanisms for disposal must be immediately available. All permitted treatment plants providing some or all of their effluent to reuse projects must have a permitted alternative means of disposal for emergencies and off-season use.

1a. Golf Course Reuse Proposals

Proposals to reuse reclaimed wastewater on golf courses must satisfactorily address the following public health related issues prior to receiving the appropriate permits from DEP.

1. Proponent(s) must demonstrate, that the permitted treatment plant can successfully achieve and maintain the water quality described in the "urban reuse" section.

2. Proponent(s) must successfully demonstrate that system repairs and replacements can be accomplished during full operation.

3. Proponent(s) must submit Best Management Plans that demonstrate how operation of the treatment and disposal systems and the facility or land use itself will be managed to minimize exposure to humans and prevent direct contact with reclaimed water.

4. As part of the Groundwater Discharge Permit application, the proponent(s) must demonstrate how they will monitor the impacts that the project has on ground and surface water quality and the performance of the land uses components that are considered part of the treatment

system. For example, if turf on a golf course is meant to remove nitrogen from the treated wastewater, the performance of the turf must be demonstrated through sample acquisition below the root layer.

1b. Demonstration of Appropriate Effluent Quality

Over the long term, all wastewater reuse projects must meet the effluent criteria described in Appendix A. Separate sets of criteria are presented for different reuse applications, for example irrigation, toilet flushing, and discharge to ground within a Zone II (which could apply to some irrigation projects). Differences in effluent criteria are based on health risk and human exposure. Permit conditions and compliance monitoring requirements for each project will be designed to verify that the reclaimed water quality consistently meets the applicable criteria. Project proponents should review the specific sections that are appropriate for their projects.

Prior to using treated wastewater for irrigation, the proponent must demonstrate the ability of the treatment system to deliver reclaimed water to meet the specified effluent quality criteria. This will be accomplished by conducting an 8-week on-line demonstration program/pilot project during which the treated water should be discharged to the alternate location (i.e., not used for irrigation). The goals of the 8-week pilot project are: (1) to characterize the effluent; (2) to demonstrate that the plant can consistently produce water of adequate quality for the project in question; and (3) to determine which less costly indicator parameters would be appropriate for long-term monitoring.

A basic list of tests that should generally be included in all demonstration/pilot projects follows. DEP reserves the right to require a more thorough characterization involving additional tests in cases where the nature of the wastewater, the design of the treatment system or intensity of potential exposures warrant special consideration.

Pilot Parameters Testing

flow
UV intensity and/or chlorine residual
BOD₅
Nitrogen series (TKN + NO₂ + NO₃N + organic N)
Phosphorus (ortho and/or total)
pH
Oil and grease
TSS and total solids
Turbidity
Metals - copper, zinc, cadmium, mercury
SVOCs
VOCs
Total or fecal coliforms
Enterococci
Heterotrophic plate count

MS-2 coliphage
Total culturable viruses
Cryptosporidium Giardia

Frequency of testing and required analysis of parameters that have been demonstrated to be absent from effluent may be relaxed or omitted from permit requirements pending a review by DEP personnel during a permit renewal. Compliance points may differ based upon the methods used to distribute, store, spray or otherwise discharge reclaimed water.

Since all treatment plant operators must demonstrate the ability to shift disposal to an alternative discharge point, they may receive a permit with different effluent quality requirements for the different forms of disposal. For example, a golf course that is spray irrigated with treated effluent during the playing/growing season may have effluent discharged to subsurface leaching areas during the rest of the year. Since the human exposure risk may be different for the two methods of disposal, the permit may reflect these differences in the number and frequency of parameter testing.

1c. Treatment Plant Reliability

Discharges of treated effluent from treatment plants in accordance with groundwater discharge permits shall be monitored regularly on schedules specifically oriented for the land use, its treatment system and related public health issues. Discharges of effluent derived from sources other than human waste will have different testing and monitoring requirements based on a characterization of their effluent.

In order to minimize the risk through exposure and to ensure that reused wastewater is treated consistently and continuously to a specified standard, the treatment plant and all support mechanisms must be extremely reliable because human contact in one form or another is possible.

All permitted treatment plants providing some or all of their effluent to reuse projects must have an alternative means of disposal for emergencies and for the “non-spraying” months. The ability to immediately shift the discharge of effluent from permitted treatment works from spray irrigation sites to other permitted discharge points must be demonstrated by reuse proponents and treatment plant permittees.

Treatment plant reliability is important to recipients of reclaimed water from both a quality and quantity perspective. Golf courses, for example, require a highly treated water for the health of the turf and a specified amount based on the number of acres irrigated. It is, therefore, important that the contracted quantity be available and treated to the level appropriate for the land use.

Treatment plants providing reclaimed water to reuse projects must be constructed, operated and maintained in accordance with standard Groundwater Discharge Permit requirements for treatment plant reliability. See Section A.2 for a more detailed discussion of these requirements.

1d. Best Management Practices

The implementation of golf course management protocols is an integral part of the goal of minimizing health risks through minimizing exposure to humans. There are a multitude of construction, operational and maintenance practices that can be employed at golf courses to minimize human exposure. Best management practices are considered a “working” part of the overall system approval, as important to minimizing risk through exposures as generating an acceptable effluent and insuring proper treatment train performance

As part of the GWDP review, DEP must review and approve of a facility management plan that describes in detail the types of best management practices that will be employed at the spray irrigation facility.

Depending upon the type of land use, the geologic setting, the sensitivity of local water resource areas and the risk of human exposure, many or all of the following practices/protocols must be employed where spray irrigating reclaimed wastewater.

- spray irrigating during non-use hours
- utilizing low trajectory sprayers
- public awareness signs indicating use of reclaimed water
- nutrient management plan reflecting fertilizer application and nutrients in sprayed wastewater
- storage ponds designed for maximizing water quality
- provide appropriate cross-connection/backflow preventing devices
- color coding of potable vs. non-potable piping and fixtures
- emergency contingency plans and contracts with spray irrigating system vendor
- procedure for immediate switch-over to non-growing season disposal system
- no ponding of sprayed water may result
- outside plumbing fixtures must have locking caps and be labeled as non potable water
- wind speed measurements must be correlated to spraying practices
- appropriate buffers to spray irrigated water must be imposed
- education of facility personnel responsible for irrigation practices.

Buffers and Barriers

To reduce the risk of human exposure, the establishment of natural barriers and buffers to eliminate aerosol drift must be undertaken by facilities spray irrigating reclaimed wastewater.

Areas of the facility receiving sprayed treated effluent must be a minimum of 100 feet from building and private wells, Class A surface water bodies and surface water intakes. Other than for private wells, project proponents utilizing a green barrier in the form of hedges or trees placed at the dwelling side of the buffer may reduce the setback distance to 50 feet.

Areas of the facility being sprayed with potable water need not employ barriers or setbacks.

To further reduce the risk of human exposure, spray irrigation must take place during non-operational hours.

Nutrients

Permits that do not impose a drinking water standard for nitrogen, nitrate or phosphorous may be issued to enhance fertilization practices. In order for permits to reflect the allowance of a different nutrient limit for reclaimed water, golf course fertilization practices must include a reduction in artificially applied fertilizer. Again, since this may require the agreement of more than one entity this issue must be addressed in a legally binding contractual agreement between the treatment plant permittee and the golf course owner/operator.

For example, a golf course that receives reclaimed water with a nitrogen concentration of 30 mg/l from a nearby treatment plant must demonstrate that the number of pounds of nitrogen dissolved in the reclaimed water is taken into account when fertilization plans for the course are considered. There should effectively be a weight for weight reduction in artificially applied fertilizers. This issue must be addressed in the Best Management Practices submittal to the Department. Failure to fulfill this BMP may lead to measurements in lysimeters that are out of compliance with permitted nitrogen concentrations.

Irrigation Storage Ponds

New man-made irrigation ponds designed to store reclaimed water, for rapid deployment on the golf course must be designed to minimize physical and biological influences that would adversely effect the quality of stored water. These design factors include, but are not limited to:

- ponds must be lined
- they must provide sufficient storage to satisfy anticipated water demand without significantly changing the morphology of the pond
- they must be aerated
- they may not present a physical hazard to the public
- the inlet/outlet structures should be located to promote pond circulation
- the pond should be sized to allow for frequent recycling of pond water. One pond volume equivalent should be pumped frequently allowing for the addition of fresh reclaimed water and the evacuation of old water
- runoff from fertilized areas should be directed away from ponds
- stormwater containment structures must be engineered to minimize nutrient transfer into ponds
- the perimeter of each storage pond should be landscaped so as to impede direct access to the water by exploratory children and youth. Signs should be placed at the perimeter indicating that direct contact with the water and/or sediment could pose a health hazard.

1e. Environmental Monitoring Plan

Proponents of wastewater reuse projects, in conjunction with discharge permit holders, are required to evaluate the water quality impacts the project may have on groundwater and surface water

quality in the form of a monitoring plan. In conjunction with the effluent monitoring requirements addressed in the groundwater discharge permit, the intent of the monitoring plan is to evaluate how application of the treated effluent affects local water resources and how components of the golf course, which are considered extensions of the treatment system, are performing. The mechanisms for monitoring groundwater quality will generally be monitoring wells which are located and constructed to strategically sample the geologic units of interest. Monitoring wells should be located between the discharges and sensitive receptors and withdrawal points. Sensitive receptors include, but are not limited to: public and private wells, surface waters, embayments and ACECs. Great care should be taken by project proponents to consider the local hydrogeology and effluent characteristics when locating and constructing monitoring wells. Measurements of water quality prior to introduction to the groundwater may be acquired through the use of lysimeters installed below the vegetative root layer. Lysimeters are useful not only for sample acquisition but also in determining evapotranspiration values and therefore infiltration rates and volumes, which may be important in guiding the position the Department assumes as it pertains to water use permitting. It also may effect the level of risk realized if significantly less effluent leaches to the water table. Long term monitoring is also intended to evaluate whether there is a build up of contaminants in upper soil horizons, possibly pathogens, metals or chlorides.

Lysimeters will be a component of the permit compliance monitoring requirements if reclaimed water is permitted to exceed the drinking water standard for nitrate or total nitrogen which is 10 mg/liter. Having nitrogen already dissolved in irrigation water is an effective and economical approach which allows for the reduction of artificially applied fertilizers and the time that it takes to apply them. Exceedances of the 10 mg/liter nitrogen standard in lysimeters should initially trigger revisitation of the artificially applied fertilizer rates. Presumably, decreasing those applications should reduce lysimeter concentrations.

In order to insure that the turf is absorbing and using the nitrogen and that the standard of 10 mg/l is met prior to encountering the groundwater table, lysimeters must be installed below the root layer and above the water table. The standard of 10 mg/l is an average for the whole site based on multiple lysimeter samples. Lysimeters should be located on sections of the golf course that receive representative volumes of water and fertilizer, such as tees and greens and fairways. Again, in order to insure that groundwater quality is not jeopardized and that the permit standard is met in the lysimeters, golf course operators must consider the combined effect of nitrogen dissolved in reclaimed water and that applied as artificial fertilizer. Reductions in artificial fertilizer application will presumably be necessary for courses using reclaimed water permitted to exceed the drinking water standards of 10 mg/l.

The contractual agreement established between the reclaimed water purveyor and the golf course operator will address the issue of compliance monitoring in lysimeters and articulate the responsibilities associated with periodic monitoring and compliance.

Monitoring and testing frequency and parameters will be determined based on the land use, the effluent quality and quantity and the sensitivity of receptors. Lysimeters and monitoring wells will be evaluated far less frequently than the quality of the effluent and presumably for fewer parameters. Site

specific determinations will be generated upon learning about the local hydrology, land use and effluent quality.

Proponents may be required to regularly acquire water levels in monitoring wells and construct water table maps if there are local water management issues or if receptors may be considered sensitive to abnormal water level fluctuations.

Surface water bodies that have the potential to be adversely effected by reuse projects may be regularly monitored for water level changes, and water quality changes. Proponents should contact DEP for further detail on potential monitoring programs.

1f. Urban Reuse Summary

Following is a list of the primary elements necessary to secure a Groundwater Discharge Permit for a treatment plant providing customers with reclaimed water and the requirements for golf course recipients of that water:

- facilities planning (sewering, infrastructure, cost, plans, etc., etc.)
- MEPA activities
- pilot testing (8 weeks) and siting report
- treatment plant and environmental monitoring program established
- Draft GWDP issued
- contractual agreement between purveyor and user
- Best Management Practices report submitted
- GWDP issued.

2a. Reclaimed Water For Landscaping Use at Nurseries

The use of reclaimed water for application at nurseries will be subject to similar requirements as spray irrigating reclaimed water on a golf course. In both circumstances the reclaimed water will effectively be received from the treatment plant owner as part of an established contract. The treatment plant owner will be responsible for meeting groundwater discharge limits appropriate for urban reuse. Through contractual agreements with the plant owner, the golf course owner or the landscaper will be responsible for implementation of the required best management practices.

The only form of reclaimed water use being considered for landscaping purposes applies to nurseries. Reclaimed water use for greenhouses will not be allowed. As our experience grows and interest expands we will consider additional guidance for other forms of landscaping.

Best Management Practices

All of the public awareness requirements and best management practices outlined in Section A.1. apply to the use of reclaimed water for landscaping. Color coded signs (purple) stating that reclaimed water is being used and that drinking is forbidden must be obviously exhibited on each property, or parcel. A fact sheet describing the reclamation process and the environmental benefits to

be gained must be available at the treatment facility. A plumbing system totally independent of the potable water system must be used to deliver reclaimed water. Irrigating must occur during non-use hours and cannot result in any ponding.

Buffers and Setbacks

The use of reclaimed water to irrigate landscapes and lawns at residential and commercial land uses raises exposure issues that the other uses do not. As a result, during our initial introduction to regulating reclaimed water use we will require that:

- No spray will be directed within 100 feet of a private well;
- There can be no spray irrigation of reclaimed water within 100 feet of any building or residential property, or 50 feet if a hedge buffer is provided;
- irrigation systems must be designed to avoid any surface ponding, the spraying of paved or impermeable areas or the creation of any surface runoff;
- irrigation systems should be designed to avoid spraying building and dwellings, decks, garages, driveways and roads;
- spray irrigation should be undertaken on a regular schedule.

C. Treated Wastewater Discharges into the Zone IIs of Community Water Systems

The artificial recharging of aquifers by discharging reclaimed water shall be undertaken in circumstances where it is necessary to replenish stream flow, enhance the productivity and capacity of an aquifer and/or improve upon or mitigate poor existing environmental conditions. Alternative disposal options within the same town/subwatershed should be evaluated prior to considering discharging in the Zone II unless direct enhancement of aquifer potential is the primary purpose.

DEP will approve proposed reclaimed water discharges into Zone IIs if they result in net overall environmental improvements within the Town or Subwatershed and will not adversely impact groundwater quality in the Zone II. Examples of these types of improvements would be sewerage and treating wastewater that previously had been discharged from failing septic systems, reusing water in basin or sub-basins considered stressed by DEP in consultation with the Department of Environmental Management, reusing water due to water use constraints imposed by Water Management Act permits or shifting the locations of existing discharges within a Zone II or among Zone IIs to improve upon hydraulic impacts and/or overall water quality.

Frequently, wastewater treatment plants have clients that discharge pollutants that are not strictly associated with human waste. These require evaluation as part of a pretreatment program. Any DEP permitted discharges of sanitary wastewater within a Zone II must meet the water quality criteria described in Appendix A and must have had a DEP approved pretreatment program that regulates and restricts the discharge of non-sanitary pollutants into sewers. Land uses that generate

two wastestreams, one from sanitary facilities for residents or staff, and one from by-products of the process they employ, must evaluate the constituents of the non-sanitary process and treat it in accordance with the appropriate disposal regulations.

Municipalities proposing to discharge wastewater from a WWTP into a Zone II must have a pretreatment permitting program that stipulates what can and cannot be discharged to the sewer in what quantities and how the wastes must be dealt with if they cannot be discharged. No contaminant may be discharged that adversely affects the operation of the WWTP nor results in a discharge of effluent from the WWTP (prior to discharge to the ground) that exceeds any max contaminant levels (MCL's) in the Safe Drinking Water Act and 310 CMR 22.50. Municipalities must describe to DEP the pretreatment programs (including inspections, audits, testing) they intend to implement during the Groundwater Discharge Permit issuance process. Prior to receiving a permit municipalities must have characterized all non-sanitary wastes, evaluated the allowable discharge quantities, established inspection and testing protocols and generally have pretreatment programs running effectively.

New and existing discharges from wastewater treatment plants within aquifer recharge areas (Zone IIs) must meet the discharge and treatment standards described for "Indirect Aquifer Recharge", *Appendix A*. Treated discharges of wastewater in Zone IIs are considered reuse because it is possible that some of the treated wastewater will be recycled through a pumping well and become an "indirect" component of the drinking water.

Please note that the standards in this section also apply to Interim Wellhead Protection Areas (IWPA). If a discharge is proposed into an IWPA, then a Zone II analysis and boundary development will be required.

No wastewater discharges will be permitted in the Zone I of any public water supply well.

1. Zone II Boundary Changes

New discharges of >100,000 gpd of reclaimed water into a Zone II will require an evaluation of whether the discharge will alter the Zone IIs boundaries as will a single discharge into the Zone II, which exceeds 20% of the approved well yield. When calculating the volume of treated wastewater recharging the aquifer, consider extremely high evapotranspiration rates during dry months for spray irrigation systems and whether the treated wastewater is generated by land uses within the Zone II and is simply replacing flow that previously went to Title 5 systems. Discharges to subsurface leaching fields are considered to have a 100% groundwater recharge rate because they are introduced below the vegetative root layer.

If modeling demonstrates that the Zone II boundaries would change and that the overall size of the Zone II has decreased, the change should be noted but none of the wellhead protection mechanisms imposed locally or at the State level shall change. If modeling indicates an expansion of the Zone II, an inventory of the land uses and determination of susceptibility of the water source to potential sources of contamination in the expanded area shall be undertaken and submitted to DEP in consideration of a formal Zone II boundary change.

2. Zone II Containment Transport Modeling

Simultaneous to reevaluating the potential changes to the Zone II boundary, newly permitted discharges must complete an evaluation which determines the groundwater time of travel from a proposed discharge site to the public water supply well for which the Zone II was delineated.

The DEP NO₃ loading model, or its equivalent, must be utilized for any proposed discharges in the Zone II of a Community Public Water Supply Well which has exceeded 5 mg/l NO₃ or where the volume of the discharge is either 100,000 gallons per day or more, or where the proposed discharge exceeds 20% of the approved well yield.

The proponent, upon running the model for the public water supply well, must demonstrate that the project will not cause the well to surpass 5 mg/l NO₃ for a buildout scenario.

3. Reliability

Treatment plants and discharge systems located within the boundaries of Zone IIs must meet the reliability standards described in Section A.2. Treatment plants designed to treat less than 40,000 gallons per day may be waived from the Class I reliability requirement.

4. New and Existing Groundwater Discharges

- a) New treatment plant discharges will not be permitted to locate within a two year time-of-travel of any public water supply well with the exception of circumstances deemed by DEP to be extraordinary and critical where no other feasible alternatives for siting the discharge exist. In these isolated and very limited circumstances additional effluent and groundwater monitoring requirements at the wastewater facility, with appropriate plant redundancy and emergency contingency plans will be required by the DEP to insure the public's health and safety. The more rigorous of the two water quality standards listed in *Appendix A* - Indirect Aquifer Recharge - will apply in these limited circumstances. Contingencies for providing the appropriate forms of treatment of the drinking water, should this become necessary, will be included in the groundwater discharge permit requirements.
- b) New treatment plants located outside the two year travel time boundary may treat to the less rigorous water quality standard listed in *Appendix A* - Indirect Aquifer Discharge.
- c) Existing treatment plants that can demonstrate four or five feet of separation and where the public water supply has not shown any evidence of water quality degradation must, at a minimum, maintain the less rigorous standard in *Appendix A* - Indirect Aquifer Recharge.
- d) Any treatment plant, new or existing, located in a Zone II which is delivering reclaimed water for uses (golf course irrigation and landscaping) described in Section B - Urban Reuse Proposals, must be capable of delivering reclaimed water that meets the Urban Reuse Standard (*Appendix A*). As was mentioned earlier, if the reuse is a seasonal allocation, off-season water

quality criteria may be less rigorous, but still in accordance with the groundwater discharge permit, if the off-season discharge is to the subsurface.

5. Groundwater and Surface Water Monitoring

Facilities discharging treated wastewater within the boundaries of a Zone II must submit, for approval by the Department, a groundwater monitoring plan that accomplishes the following goals:

- 1) evaluates upgradient (background) groundwater quality;
- 2) evaluates the performance of land use components that are considered part of the treatment process (turf on a golf course for NO₃ removal);
- 3) evaluates the overall impact of the project on local groundwater quality;
- 4) acts as an early warning system between the discharge and sensitive receptors.

Surface water bodies and rivers located within the boundaries of a Zone II that are potentially impacted by treated wastewater discharges must be monitored for changes in water quality that might result in increased weed growth, eutrophication, algal blooms or other nutrient or pathogen related changes.

Testing parameters, sampling locations and sampling frequencies will be based on the local hydrogeologic conditions, the sensitivity of the pond and characteristics of the effluent.

6. Public Water Supply Testing Waivers

Volatile Organic Contaminant (VOC) testing waivers will not be considered for PWS's that have a permitted wastewater treatment plant in the Zone II (zone of contribution) of their well(s).

Decisions about the feasibility of acquiring or maintaining IOC (Inorganic Contaminants), SOC (Synthetic Organic Contaminants) or Technical Criteria waivers will be made on a case-by-case basis.

7. Permit Findings

The fact sheets associated with groundwater discharge permits issued to treatment plants locating in a Zone II wastewater must describe in detail the public health and environmental benefits to be gained by locating the discharge in the Zone II and how these benefits compare to the disadvantages and risks associated with the siting.

D. Toilet Flushing

Treating wastewater and reusing or recycling it to flush toilets saves water and may diminish the need for leaching areas sized in accordance with standard design criteria.

Reclaimed water for toilet flushing may be employed at facilities where public access to the plumbing is not allowed. It will not be allowed for residences, only for commercial establishments. The use of reclaimed water within a building must be reviewed and approved by the local Board of Health.

Water used to flush toilets must meet the reclaimed water quality standard for "Urban Reuse" as described in *Appendix A*.

In deciding whether reclaimed water projects will be regulated under the Groundwater Discharge Permit program or the State Environmental Code, Title 5, the design flows for the facility should be calculated using Title 5 design flow criteria. If using Title 5 design criteria the projected flows equal or exceed 10,000 gallons per day then the project will be regulated under the Groundwater Discharge Permit program, if they are below 10,000, they will be regulated under Title 5.

Project proponents utilizing technologies that do not have a General Use permit and the design flow of which is below 10,000 gallons per day must get a Disposal System Construction permit from the local Board of Health and must also seek piloting approval from DEP's Innovative/Alternative program for wastewater.

This section on toilet flushing focuses on systems regulated under the Groundwater Discharge Permit program.

1. Leaching and Reserve Area Requirements

Project proponents must provide documentation of the flows using water use data from comparable facilities utilizing the same recycling technology. Information from other states is acceptable.

All leaching areas for reclaimed water systems must utilize a pressure distribution system for the leaching area. Leaching areas must be sized based on demonstrated water use information. And must be capable of accepting the average daily flow assuming that peak flows have been equalized and incorporated into that flow volume.

For new facilities, a reserve area capable of disposing of the average daily flow must be provided. Existing facilities attempting environmental improvement through the use of a recycling system, that cannot provide a full reserve area, shall be assessed on a case by case basis. Expansions of existing facilities must make best efforts to provide a full reserve area comparable to those required for new facilities. Those that cannot will also be assessed on a case by case basis.

There must be on-site storage tanks capable of holding two days worth of anticipated flow under circumstances where the recycling system is not functioning must be provided at the facility.

Reclaimed Water Quality

As was mentioned earlier, the treatment technology treating the water recycled to toilets must be able to consistently meet the “urban reuse” standard stipulated for toilet flushing in *Appendix A*.

Please refer back to Section C.4 to evaluate the level of treatment necessary for the permitted discharge which depends on the plant’s location in relation to public water supply wells. The discharge standard may differ from that imposed on the recirculated toilet water.

Demonstration of the ability to meet the reuse standard in toilet water and effluent recharged to the ground may include documentation from other states, and comparable facilities in Massachusetts. As is the case with all projects including reclaimed water, an on-line 8 week pilot must be undertaken that demonstrates the technology’s ability to meet the appropriate reuse standard consistently.

Public Awareness

All facilities utilizing reclaimed water for toilet flushing must follow the recommendations and requirements in the public awareness Section A.7 of this document.

Monitoring Requirements

Facilities that use reclaimed water for toilet flushing in conjunction with a groundwater discharge must test both.

The parameters and testing frequency for the groundwater discharge will be in keeping with customary discharge permit requirements.

The reclaimed water will be tested more frequently for pathogens or pathogenic indicators, the specifics of which should be resolved during the 8 week on-line pilot. Groundwater and possibly surface water monitoring requirements will follow typical groundwater permit requirements.

Operation and Maintenance

The long term operation/maintenance of the treatment technology providing the reclaimed water for the toilet flushing is important for meeting pathogenic permit requirements and protecting the public health.

The operation and maintenance requirements for treatment plants (314 CMR 12.00) describe the routine maintenance necessary. The assignment of a Certified Operator under 257 CMR 2.00 by the Massachusetts Board of Certification is meant to stipulate the level of training and education required of an operator. All treatment plants require an operator. Sophisticated treatment systems

treating wastewater to a point where it is safe for land uses in the urban reuse categories require an advanced level operator.

An Operation and Maintenance (O&M) Manual will be required for the operation of all wastewater treatment facilities. A separate section within the manual describing the water reuse components and associated O&M will also be required.

Manufacturers warranties, guarantees and long term maintenance plans should be carefully reviewed and implemented. The old saying “an ounce of prevention is worth a pound of cure” that is so frequently applied to environmental issues is very applicable to treatment plant care.

Plants reclaiming water to urban reuse standards will require more and better care than those achieving less standards. The costs associated with this higher level of maintenance should be taken into consideration when costing out reclamation projects.

Appendix A - Reclaimed Water Standards

Types of Reuse - Urban Reuse	Setbacks and buffers ³
<p>Spray irrigation of:</p> <ul style="list-style-type: none"> • golf courses • landscaping projects <p>Required Treatment Level¹</p> <ul style="list-style-type: none"> • secondary⁴ • filtration⁵ • disinfection⁶ 	<ul style="list-style-type: none"> • No spray may be directed within 100 feet of any building or residential property, 50 feet if a suitable hedge buffer is provided • No spray may be directed within 100 feet of a private well • No spray may be directed into the Zone 1 of public water supply wells.
Required Reclaimed Water Quality ²	Required Reclaimed Water Monitoring
<ul style="list-style-type: none"> • pH 6 – 9 • ≤ 10 mg/l BOD⁷ • ≤ 2 NTU⁸ • fecal coliform - median of no detectable colonies/100 ml over continuous, running 7 day sampling periods, not to exceed 14/100 ml⁹ • TSS - 5 mg/l • Total Nitrogen - < 10 mg/l • Class 1 Groundwater Permit Standards (SDWA Drinking Water Standards)¹⁰ 	<ul style="list-style-type: none"> • pH - daily • BOD - weekly • Turbidity - continuous • Fecal coliform - daily • Disinfection UV intensity - daily or chlorine residual - daily • TSS - 2 x week • Nitrogen - 2 x month • Phosphorus 2 x month • Permit Standards - variable testing requirements¹⁰ • Heterotrophic plate count - quarterly • MS-2 phage - quarterly
Comments	
<ul style="list-style-type: none"> • Reclaimed water must be clear, odorless and be virtually pathogen and contaminant free. • Reclaimed water delivered from treatment plants for a reuse must undergo a full chemical and microbiological characterization and pilot or performance test prior to implementation of reuse program. • All reclaimed water projects must include appropriate public awareness techniques described herein including, but not limited to: <ul style="list-style-type: none"> - fact sheet/brochures - color coding of all plumbing - signage (multilingual and pictorial) • Treatment plants providing reclaimed water for reuse projects must have immediate, permitted discharge alternatives. 	

<p><u>Type of Reuse - Urban Reuse</u></p> <p>. Toilet flushing</p> <p><u>Required Treatment Level¹</u></p> <p>. Secondary</p> <p>. Filtration (possibly)</p> <p>. Disinfection</p>	
<p><u>Required Reclaimed Water Quality²</u></p> <p>. pH 6 – 9</p> <p>. ≤ 30 mg/l BOD⁷</p> <p>. ≤ 5 NTU⁸</p> <p>. fecal coliform - not to exceed 100 colonies/100 ml⁹</p> <p>. TSS - 10 mg/l</p> <p>. Total Nitrogen - < 10 mg/l</p> <p>. Class I Groundwater Permit Standards¹⁰</p>	<p><u>Required Reclaimed Water Monitoring</u></p> <p>. pH - weekly or daily</p> <p>. BOD - weekly</p> <p>. Turbidity - continuous</p> <p>. Fecal coliform - 1 x week</p> <p>. Disinfection UV intensity - daily or chlorine residual - daily</p> <p>. Chlorine residual - daily</p> <p>. TSS - weekly</p> <p>. Nitrogen - 2 x month</p> <p>. Permit Standards - variable testing requirements¹⁰</p>
<p><u>Comments</u></p> <p>. Reclaimed water must be clear, odorless and be virtually pathogen and contaminant free.</p> <p>. Reclaimed water delivered from treatment plants for reuse must undergo a full chemical and microbiological characterization and pilot or performance test prior to implementation of reuse program.</p> <p>. All reclaimed water projects must include appropriate public awareness techniques described herein including, but not limited to:</p> <ul style="list-style-type: none"> - fact sheet/brochures - color coding of all plumbing - signage (multilingual and pictorial) <p>. Treatment plants providing reclaimed water for reuse projects must have immediate permitted discharge alternatives.</p>	

<p><u>Type of Reuse - Indirect Aquifer Recharge</u></p> <p>- Discharges into aquifer recharge areas as defined by Zone II boundaries and groundwater discharges that will recharge reservoirs or tributaries to reservoirs.</p> <p><u>Required Treatment Level</u></p> <ul style="list-style-type: none"> . secondary⁴ . filtration (possibly)⁵ . disinfection⁶ 	<p><u>Discussion</u></p> <p>Attached</p>
<p><u>Required Reclaimed Water Quality</u>²</p> <ul style="list-style-type: none"> . pH 6 – 9 . BOD - ≤ 10 mg/l or ≤30 mg/l . ≤ 2 NTU or ≤ 5 NTU . fecal coliform – median of no detectable colonies/100 ml over continuous, running 7 day sampling periods, not to exceed 14/100 ml or 200 colonies/100 ml . TSS - 5 mg/l or 10 mg/l . Total Nitrogen - < 10 mg/l . Class I Groundwater Permit Standards (SDWA Drinking Water Standards)¹⁰ 	<p><u>Required Reclaimed Water Monitoring</u></p> <ul style="list-style-type: none"> . pH - weekly or daily . BOD - weekly . Turbidity - continuous . Fecal coliform - daily or 2/week • Metals -quarterly. TSS - weekly or 2/week . Nitrogen - 1 or 2/week • MS-2 phage - quarterly • Total culturable viruses - quarterly . Variable testing requirements 0 Disinfection UV intensity - daily or chlorine residual - daily
<p><u>Comments</u></p> <p>New treatment plants located in approved Zone IIs with less than a two year groundwater travel time to the public water supply well must treat to the more rigorous of the two standards listed above.</p> <p>Existing treatment plants that can demonstrate the four or five feet of separation and where the well has not shown any evidence of water quality degradation, may maintain the lesser standard.</p> <p>Massachusetts Drinking Water Program waivers reducing the required sampling of Public Water Supply Wells will not be issued if there are permitted Groundwater Discharges in the Zone II.</p> <p>Treatment plants that meet the criteria listed above are considered to be improvements over unsewered Title 5 systems as it pertains to SDWA Susceptibility Assessments.</p>	

Footnotes:

- ¹ These treatment level requirements are based on the types of technologies deemed necessary to provide specific effluent quality. If proven innovative/alternative technologies deliver comparable effluent quality to these traditional forms of treatment they may be substituted.
- ² Unless otherwise noted, recommended quality limits apply to the reclaimed water at the point of discharge from the treatment facility.
- ³ Setback distances are recommended to protect potable water supply sources from contamination and to protect humans from unreasonable health risks due to exposure to reclaimed water.
- ⁴ Secondary treatment processes include activated sludge processes, trickling filters, rotating biological contactors, and many stabilization pond systems. Secondary treatment should produce effluent in which both the BOD and SS do not exceed 30 mg/l.
- ⁵ Filtration means the passing of wastewater through natural undisturbed soils or other filter media such as sand and/or anthracite.
- ⁶ Disinfection means the destruction, inactivation, or removal of pathogenic microorganisms by chemical, physical, or biological means. Disinfection may be accomplished by chlorination, ozonation, other chemical disinfectants, UV radiation, membrane processes, or other processes.
- ⁷ As determined from the 5-day BOD test.
- ⁸ The recommended turbidity limit should be met prior to disinfection. The average turbidity should be based on a 24-hour time period. The turbidity should not exceed 5 NTU at any time.
- ⁹ Unless otherwise noted, recommended coliform limits are median values determined from the bacteriological results of the last 7 days for which analyses have been completed. Either the membrane filter or fermentation tube techniques may be used.
- ¹⁰ Typical Groundwater Discharge Permit Sampling Requirements:

Parameters

Flow
 BOD
 TSS
 TS
 Nitrate
 Total Nitrogen
 PH
 VOC
 Fecal Coliform
 Phosphorus - surface H₂)
 Surfactants – laundry

Appendix B

Information concerning permits and programs issued or implemented by the Massachusetts Department of Environmental Protection may be acquired by contacting the Service Centers in our four Regional Offices.

Service Center Location	Contact	Telephone	Fax
Wilmington- NERO Northeast Regional Office	Judy Barber	(781) 932-7677 (781) 932-7678	(781) 932-7615
Worcester - CERO Central Regional Office	Bob Higgins Ken Foley	(508) 729-7650 -	(508) 792-7621 -
Springfield - WERO Western Regional Office	Gail Gates	(413) 784-1100	(413) 784-1149
Lakeville - SERO Southeast Regional Office	John Viola Lori Rogers	(508) 946-2700	(508) 947-6557

DEP MODEL AGREEMENT FOR THE DELIVERY
AND USE OF RECLAIMED WATER
FOR SPRAY IRRIGATION AT _____

[NOTE: This Model Agreement uses italicized text to indicate suggested language which the Parties may modify at their own discretion.]

THIS AGREEMENT is made and entered into this ____ day of _____, 19____, between _____ hereinafter referred to as the "USER", and the City/Town of _____, a Massachusetts municipal corporation, hereinafter referred to as "CITY"/ "TOWN".

WITNESSETH:

WHEREAS, the CITY/TOWN owns, maintains and operates wastewater treatment facilities serving the CITY/TOWN of _____; and

WHEREAS, such treated effluent, hereafter referred to as "reclaimed water", is a valuable water resource which can be safely used for Urban Reuse purposes as described in the Department of Environmental Protection Interim Guidance for Reclaimed Water Use (Winter 1999) (hereinafter "Department's Interim Guidance") including spray irrigation; and

WHEREAS, the CITY/TOWN desires to reuse this reclaimed water for spray irrigation and related purposes as a means of effluent disposal; and

WHEREAS, USER owns certain land known as the _____ Golf Course in _____, Massachusetts consisting of _____ acres of land and as further described in Exhibit "A" [Exhibit A should describe the property by reference to deed book and page and metes and bounds.]; and

WHEREAS, USER operates the _____ Golf Course and will be the party responsible to perform the covenants of this Agreement; and

WHEREAS, USER desires to purchase reclaimed water from the CITY/TOWN pursuant to the terms and conditions set forth herein to use for spray irrigation of certain areas of _____ Golf Course (the "Irrigated Site") as further described in the CITY'S/TOWN'S Groundwater Discharge Permit; and

WHEREAS, CITY/TOWN has obtained a groundwater discharge permit from the Department of Environmental Protection (the "Department") pursuant to 314 CMR 5.00 which permits the supply and use of reclaimed water to and by the USER in accordance with the Department's Interim Guidance for Reclaimed Water Use;

NOW, THEREFORE, in consideration of the foregoing and the mutual covenants contained herein, the CITY/TOWN and USER do hereby agree as follows:

1. EASEMENTS.

USER will grant to the CITY/TOWN an easement for the delivery and use of the reclaimed water on the USER's property. The grant of easement and the legal description of the property subject to the easement are incorporated by reference, attached hereto as Exhibit "B", and made a part of this Agreement.

2. TERM OF THE AGREEMENT.

The CITY/TOWN shall deliver and the USER shall accept and use reclaimed water produced by the CITY/TOWN from its wastewater treatment facilities, and this Agreement shall be effective for a term of twenty (20) years [or as otherwise agreed to by the Parties, but in no case for a shorter duration than the term of the CITY/TOWN's groundwater discharge permit] from the date of commencement of delivery of reclaimed water. It is anticipated, but not warranted, that delivery of reclaimed water will commence in the calendar year of _____. The term of this Agreement shall be renewed automatically from year to year beyond the initial twenty (20) year term, unless terminated by the USER by written notice not less than one year (365 days) [or as otherwise agreed to by the Parties] in advance of the anniversary of the commencement of each renewal.

3. USE OF RECLAIMED WATER: USER'S IRRIGATION SYSTEM.

(a) The USER shall use reclaimed water delivered by the CITY/TOWN for Urban Reuse including spray irrigation in accordance with: (i) the terms and conditions of the Groundwater Discharge Permit issued to the CITY/TOWN by the Department; and (ii) with the Department's Interim Guidance for Reclaimed Water Use as it may be amended or superseded by policy and/or regulation; and (iii) with all other applicable local, state, and federal regulations.

(b) The USER agrees to receive reclaimed water within thirty (30) days of receipt of written notice from the CITY/TOWN to be given on or after the estimated delivery. The USER shall be solely responsible for the operation and maintenance of all portions of the USER's irrigation system located within the boundaries of USER's property and in accordance with the terms and conditions contained in the CITY/TOWN's Groundwater Discharge Permit.

4. EFFLUENT QUALITY AND VOLUME.

(a) The CITY/TOWN warrants that the reclaimed water: (i) has been treated by a method sufficient to remove harmful levels of bacteria, viruses and other constituents which would pose a danger to human health or cause it to be unsuitable for purposes of spray irrigating USER's property; and (ii) meets the effluent quality criteria and limitations and conditions of the CITY/TOWN's Groundwater Discharge Permit.

(b) The CITY/TOWN shall monitor effluent quality according to the requirements of its Groundwater Discharge Permit. The USER may use other irrigation water during any such periods when reclaimed water is unavailable. If at any time the quality of reclaimed water delivered under this Agreement falls below the minimum standards required by the Department or shall constitute an imminent threat to public health, safety or the environment, the CITY/TOWN shall notify USER as soon as practicable and all spray irrigation shall be discontinued until such time as the effluent quality is restored to acceptable levels. In such event, the CITY/TOWN shall engage the alternative system of disposal.

(c) The CITY/TOWN will deliver reclaimed water meeting the minimum standards for Urban Reuse for spray irrigation purposes, and the USER shall have the right to receive up to ____ mgd of reclaimed water to be supplied by CITY/TOWN. The CITY/TOWN shall install an appropriate meter at the point of delivery to measure the volume of reclaimed water delivered.

5. POINT OF DELIVERY.

The Point of Delivery of reclaimed water from the CITY/TOWN to the USER shall be _____. The CITY/TOWN shall own, operate and maintain the reclaimed water distribution system upstream of the Point of Delivery. The USER shall own, operate and maintain all works downstream of the Point of Delivery. For purposes of this Agreement, CITY/TOWN shall be deemed in possession and control of the reclaimed water until it shall have been delivered to USER at the Point of Delivery. After the Point of Delivery, USER shall be deemed to be in possession and control thereof.

The USER shall provide, if necessary, in a manner approved by the Department, appropriate backflow prevention control devices between the reclaimed water irrigation system and any other spray irrigation water source(s). The cost of such devices and their installation shall be borne by the USER, and the complete operation of the check valve shall be the responsibility of the USER. The USER agrees to identify to the CITY/TOWN all well(s) connected to the spray irrigation system.

6. USER COMPLIANCE: OPERATION AND MAINTENANCE.

(a) USER shall be responsible for ensuring compliance with all terms and conditions of the Groundwater Discharge Permit, Interim Guidance for Reclaimed Water Use, and all federal, state and local laws applicable to the reclaimed water distribution system downstream of the point of discharge. USER expressly acknowledges that the CITY/TOWN shall have the right to enforce compliance with the terms and conditions of this Agreement in a court of competent jurisdiction, and furthermore, USER agrees to pay any penalties, fines, or damages attributed to USER'S noncompliance with the terms and conditions of this Agreement, the Groundwater Discharge Permit, Department's Interim Guidance, or any federal, state or local laws applicable to the reclaimed water distribution system downstream of the point of discharge.

(b) USER agrees to employ Best Management Practices as defined in the Department's Interim Guidance in the operation and maintenance of the Golf Course in accordance with a facility management plan and an Environment Monitoring Plan approved by the Department.

(c) The USER agrees to allow construction of monitoring wells at the site, and to allow the CITY/TOWN access to the site during normal operating hours for purposes of monitoring, collecting samples, and conducting inspections.

(d) *(In cases where the Department requires the use of lysimeters, the following provision shall be included in the Agreement) The USER agrees to install/allow construction of lysimeters below the root layer and above the water table to measure compliance with the standard of 10 mg/l nitrogen. The USER recognizes the need to consider the combined effect of nitrogen dissolved in the reclaimed water as well as nitrogen applied as artificial fertilizer, and make reductions in artificial fertilizer application as necessary to ensure compliance with the 10 mg/l nitrogen standard.*

7. NON-POTABLE WATER AND PUBLIC AWARENESS

USER shall be responsible for ensuring that the reclaimed water is not used as a potable water source. To this end, USER shall post public awareness signs identifying the reclaimed water and warning against consumption; color code plumbing and fixtures of the distribution system according to the Department's Interim Guidance, and publish public informational materials concerning the use of reclaimed water.

8. RIGHT TO SET RATES, FEES AND CHARGES.

(a) *The CITY/TOWN, subject to the terms herein, reserves the right to set rates, fees and charges for the provision of treated effluent in accordance with the authority vested in CITY/TOWN*

(b) The rate for reclaimed water shall be \$_____ per day, regardless of the actual quantity used for the initial two years of service. This rate is based upon an estimated average usage of _____ gallons per day at an initial rate of \$_____ per 1000 gallons. After said two year term the CITY/TOWN shall have the right to increase the rates if justified by a rate study. Any such rate increase shall not exceed a uniform percentage increase given to all other users of reclaimed water.

(c) The CITY/TOWN shall bill the USER monthly. Payment shall be made to the CITY/TOWN within 30 days following receipt of the bill. The CITY/TOWN, in addition to all other legal remedies, shall have the right to discontinue service for the nonpayment of charges.

9. DELIVERY OF RECLAIMED WATER UNDER ADVERSE CONDITIONS.

(a) Adverse weather conditions or unforeseen circumstances may necessitate modification of the normal delivery schedule. The USER shall have the right to restrict the quantity of reclaimed water used in the event of adverse weather conditions or unforeseen circumstances and after the CITY/TOWN has engaged the alternative disposal site. Notice to the CITY/TOWN of the USER's intent to restrict the use of the reclaimed water shall be in writing and in advance. If advance notice to the CITY/TOWN is not practical, then the USER shall immediately give oral notice of the restriction to be followed in writing with a full description of the circumstances justifying the restriction.

(b) Both parties also recognize that adverse weather conditions or unforeseen circumstances may result in a need for use of reclaimed water greater than the volume set forth in Paragraph 4(c). USER shall have the right to draw additional water, subject to availability of reclaimed water supplies during these events. During any period in which USER exercised the right to draw additional reclaimed water, the CITY/TOWN shall furnish such reclaimed water as the transmission and delivery systems are capable of handling.

10. INABILITY TO DELIVER.

The CITY/TOWN shall not be liable to USER for failure to deliver reclaimed water caused by forces or events beyond the control of the CITY/TOWN or the negligence of the CITY/TOWN. If and when situations occur where the

CITY/TOWN cannot deliver reclaimed water, the CITY/TOWN shall notify the USER by telephone and follow up with a letter stating the nature of the emergency and the anticipated duration.

11. DISCLAIMER OF WARRANTIES.

(a) *Express Warranties. The CITY/TOWN disclaims all express warranties except those which appear in Paragraph 4 of this Agreement. The CITY/TOWN does not represent nor warrant that the reclaimed water delivered to the USER shall increase the productivity of the Irrigation Site or result in any changes to the land or vegetation. Further, the use of any plans, specifications, water quality analysis or treated wastewater samples during the negotiations leading to this contract serve to merely indicate the general quality of reclaimed water which will be delivered to the USER. Such plans, specifications, water quality analysis or treated wastewater samples create no warranty that the reclaimed water delivered by the CITY/TOWN will conform to these items.*

(b) *Implied Warranties. The CITY/TOWN disclaims any implied warranties of merchantability or fitness of the Reclaimed Water delivered under this contract for any purpose.*

12. EARLY TERMINATION OR ASSIGNMENT.

(a) The USER shall have the right to terminate its obligations under this Agreement upon one year (365 days) [or as otherwise agreed to by the Parties] advance written notice to the CITY/TOWN.

(b) The CITY/TOWN, after reasonable advance written notice to the USER, shall have the right to terminate this Agreement if performance is prevented by third-party litigation, inability to issue or market bonds or any other event beyond the control of the CITY/TOWN.

(c) The CITY/TOWN shall have the right to terminate this Agreement if USER fails to receive and use in accordance with the terms and conditions of this Agreement and the Groundwater Discharge Permit the reclaimed water. Failure to exercise this right shall not constitute a waiver by the CITY/TOWN's right to terminate this Agreement for subsequent breaches.

13. EXCUSE FROM PERFORMANCE BY GOVERNMENTAL ACTS.

If for any reason during the term of this Agreement, local, state or federal governments or agencies shall fail to issue necessary permits, grant necessary approvals, or shall require any change in the operation of the treatment.

transmission and distribution systems or the application and use of reclaimed water, then to the extent that such requirements shall affect the ability of any party to perform any of the terms of this Agreement, the affected party shall be excused from the performance thereof and a new Agreement shall be negotiated by the parties hereto in conformity with such permits, approvals, or requirements.

14. TRANSFER OR MODIFICATION OF USER'S COMMITMENT.

(a) Sale of Land. The USER's right to sell, transfer or encumber the land described in Exhibit "A" shall not be restricted by this Agreement, except that written notice of any proposed sale or transfer must be given to the CITY/TOWN and the Department at least thirty (30) days prior to the sale or transfer, and any subsequent party in interest shall be obligated to receive and use the allocation of reclaimed water described in Paragraph 4(c) of this Agreement, and to abide by all the terms and conditions of this Agreement.

(b) If transferred to another user, the transferee shall also execute an acknowledgment and acceptance of the terms and conditions of this Agreement.

15. LIABILITY.

(a) *The CITY/TOWN, subject to the limits of sovereign immunity, of which there is no waiver herein intended, shall indemnify and hold harmless the USER, including its officers, directors, employees and agents, against any and all claims, actions, suits, proceedings, costs, expenses, damages or liabilities arising out of the following:*

(i) Claims related to the CITY'S/TOWN'S construction, erection, location operation, maintenance, repair, installation, replacement or removal of that part of the system controlled by the CITY/TOWN for effluent disposal and reuse; and

(ii) Claims arising out of CITY'S/TOWN'S negligence or omissions within an area controlled by USER, or claims arising out of CITY'S/TOWN'S negligence or omissions within an area controlled or maintained by CITY/TOWN.

(b) *The CITY'S/TOWN'S obligation to indemnify the USER shall be conditioned upon the USER'S compliance with this Agreement and the Groundwater Discharge Permit and any additional reasonable operating practice restrictions which the CITY/TOWN may establish from time to time and provide to the USER;*

(c) *The USER shall save and hold harmless and indemnify CITY TOWN, its agents, representatives and employees from all claims, costs, penalties, damages and expenses (including attorneys' fees) arising out of the following:*

(i) Claims related to the USER's construction, erection, location, operation, maintenance, repair, installation, replacement or removal of that part of the system controlled by the USER for effluent disposal and reuse; and

(ii) Claims arising out of USER'S negligence or omissions within an area controlled by CITY/TOWN, or claims arising out of USER'S negligence or omissions within an area controlled or maintained by USER.

17. CONTAMINATION COSTS.

CITY/TOWN shall accept responsibility for any costs that are the direct result of pollution or contamination caused by effluent of inadequate quality as required by the appropriate regulatory agency and which defective effluent is under CITY/TOWN control and due to the fault of the CITY/TOWN.

If defective effluent under the control of the USER is due to the actions or inactions of the USER, the USER shall accept responsibility for any such costs.

18. ACCESS.

The CITY/TOWN shall have the right, at all reasonable times and upon written notice to the USER in advance, to enter upon the property of the USER to review and inspect the facilities and operations of the USER with respect to conditions agreed to herein. In accordance with the Groundwater Discharge Permit, the USER shall allow the Department, its agents, contractors, subcontractors and employees, to enter upon the property of the USER to review and inspect the facilities and operations of the USER with respect to conditions agreed to herein.

19. DISCLAIMER OF THIRD PARTY BENEFICIARIES.

This Agreement is solely for the benefit of the formal parties hereto and no right or cause of action shall accrue upon or by reason hereof, to or for the benefit of any third party not a formal party hereto.

20. MODIFICATIONS/AMENDMENTS.

This Agreement may be modified or amended only with the consent of both parties provided, however, that prior to any such modification or amendment the parties notify the Department in writing at least thirty (30) days in advance and the Department has approved such modification or amendment in accordance with the Department's requirements for permit modifications at 314 CMR 5.12.

21. SEVERABILITY.

If any part of this Agreement is found invalid or unenforceable by any court, such invalidity or unenforceability shall not affect the other parts of this Agreement if the rights and obligations of the parties contained therein are not materially prejudiced and if the intentions of the parties can continue to be effected.

23. BINDING UPON SUCCESSORS.

This Agreement shall be binding upon and shall inure to the benefit of the successors or assigns of the parties hereto.

24. APPLICABLE LAW.

This Agreement and the provisions contained herein shall be construed, controlled, and interpreted according to the law of the Commonwealth of Massachusetts.

25. NOTICES.

All notices required or authorized under this Agreement shall be given in writing and shall be served by mail on the parties at the addresses listed below:

CITY/TOWN: _____

USER: _____

DEPARTMENT: Reclaimed Water Use Program
Department of Environmental Protection
One Winter Street, 6th Floor
Boston, MA 02108

26. ENTIRE AGREEMENT.

This written agreement constitutes the entire Agreement between the parties. Modifications to and waivers of the provisions herein shall not be binding unless made in writing and signed by the parties hereto.

In WITNESS WHEREOF, the parties hereto have set their hands and seals on the date first above written

USER:

COMMONWEALTH OF MASSACHUSETTS

_____, ss.

_____, 19__

Then personally appeared the above-named _____ and acknowledged the foregoing instrument to be his/her free art and deed, before me.

My Commission Expires:

Notary Public

ATTEST:

CITY/TOWN:

CITY/TOWN CLERK

By: _____

Approved as to form:

City Solicitor/Town Counsel

APPENDIX D



**Do not
drink**

Addendum No. 1

The Massachusetts Department of Environmental Protection has developed interim guidance describing how the use of reclaimed water will be regulated in the state. Initially, the guidance has limited the approved uses to spray irrigation of golf courses, landscaping, artificially recharging aquifers, and toilet flushing. This decision was based on our research, particularly into the existing reclamation programs of other states, that these are accepted uses, which with the proper safeguards, can protect the public health.

However, the guidance recognized that there are other potential uses for reclaimed water, and the Department may approve these in the future as we gain additional knowledge and experience. Consequently, we intend to “pilot” reclaimed water projects not specifically listed in our guidelines. In this manner, the projects will be operated in conditions specific to Massachusetts. The results of the field testing program will be utilized to determine whether the proposed project can be approved for general use here, and if so, under what conditions.

In order for a project to be evaluated on a pilot basis, the following criteria must be met:

1. Submission of the groundwater discharge permit application along with engineering plans and specifications.
2. Submission of technical data from other states on similar projects, including reclaimed water standards and actual field performance.
3. The proposed project must include an environmental monitoring and reporting plan, covering a period of operation as determined by the Department, that will produce a timely and full technical evaluation of the performance of the system, including prompt identification of performance difficulties and the effectiveness of any corrective actions or adjustments of the system. Following the end of the evaluation period, a report shall be submitted to the Department for review and comment.
4. The proposed project must include provisions for a contract with a vendor or in another manner acceptable to the Department and the local approving authority to ensure that the necessary operation and maintenance activities will be performed appropriately.
5. The applicant must submit a contingency plan which can be implemented if the pilot project, based on a review of monitoring reports and/or other data, will not be approved for long-term use. The applicant must demonstrate that an acceptable site exists to dispose of all the wastewater flows from the project in accordance with the requirements of 314 CMR 5.00 & 6.00, including the existing Reclaimed Water Use interim guidance, as applicable, and that an alternate potable water source is available to meet all project needs.
6. The Department may establish special conditions in the groundwater discharge permit, as it deems necessary, to ensure protection of public health, safety, welfare, and the environment.

The submission will be reviewed jointly by the Boston office and the appropriate regional office, with Boston staff having the right of final approval or disapproval. If, based on the pilot program, a new form of reclaimed water project is approved for use in Massachusetts, a set of water quality standards will be established and incorporated into the interim guidance by amendment. Any subsequent project of that type must be designed to meet those standards. All other applicable provisions of the Reclaimed Water Use guidance will remain in force.

